

WHEY YEAST RAT-FEEDING STUDY

The conversion of whey waste into a potential food or feedstuff by fermentation with *Saccharomyces fragilis* has been accomplished by Wasserman et al. (2, 3). This raises the question as to whether any undesirable effects would be encountered from the ingestion of such a yeast. Recently, Bender and Doell (1) reported the absence of any harmful effects on the rat when three different food yeasts were fed at dietary levels of 21% for four to six months.

The biological value of the protein of whey yeast has been evaluated by the Wisconsin Alumni Research Foundation (personal communication). During a 4-wk period, the protein efficiency ratio decreased from 2.8 to 1.5 when rats were fed a diet containing 9% protein, contributed entirely by whey yeast in place of casein, and the average weight gain decreased from 100.3 to 50.4 g.

In this note we report the results of feeding whey yeast and brewers' yeast to rats on two

different diets for a period of 90 days. The ingredients of the two basal diets are given in Table 1 (Diets 1A and 1B). The Diet B series involved a greater dependence on protein supplied by the two yeasts, which were added on the basis of contributing equal amounts of protein. *S. fragilis*, in common with most yeasts used for food purposes, is low in sulfur-amino acids. For this reason Diet 4B, containing added methionine, was included. Weanling male albino rats (five per diet) were caged together in solid-bottom cages with wood shavings as litter, and allowed free access to food and water.

Body weight gains and efficiency of food utilization data are presented in Table 2. In the Diet A series, growth was slightly, although not significantly, improved when a 20% level of either whey or brewers' yeast was added. The food efficiency ratios were unchanged. However, when most of the dietary protein was provided by the yeast supplements (Diet B series),

TABLE 1
Composition of diets

Dietary ingredients	Diet no.						
	1A	2A	3A	1B	2B	3B	4B
	[Composition (%)]						
Corn meal	73.0	58.4	58.4	73.0	63.0	68.5	68.0
Linseed meal	10.0	8.0	8.0	10.0	.....	.....	.....
Crude casein	10.0	8.0	8.0	10.0	.....	.....	.....
Alfalfa meal	2.0	1.6	1.6	2.0	2.0	2.0	2.0
Bone ash	1.5	1.2	1.2	1.5	1.5	1.5	1.5
Sodium chloride	0.5	0.4	0.4	0.5	0.5	0.5	0.5
Cod-liver oil	3.0	2.4	2.4	.....	.....	.....	.....
Corn oil	.....	.....	.....	3.0	3.0	3.0	3.0
Vitamins A and D ^a	.....	.....	.....	0.1	0.1	0.1	0.1
Brewers' yeast ^b	.....	20.0	.....	.....	30.0	.....	.....
Whey yeast ^b	.....	.....	20.0	.....	.....	24.5	24.5
DL-Methionine	.....	.....	.....	.....	.....	.....	0.5
% Protein (calculated)	17.1	21.9	23.5	17.1	17.5	17.8	17.8

^a 2,500 I.U. Vitamin A palmitate and 300 I.U. Vitamin D₃ per 100 g diet.

^b Protein content of whey yeast (N × 6.25) = 49.1%; brewers' yeast = 40.5%.

TABLE 2
Growth and food efficiency of rats on whey and brewers' yeast diets for 90 days

Diet no.	Supplement	Start	Mean body weights (g)	Food efficiency
			Gain ± std. error	Wt. gain/food intake
1A	None	38.6	243 ± 14.1	0.23
2A	Brewers' yeast	39.5 ^a	259 ± 11.6	0.23
3A	Whey yeast	38.6	263 ± 9.7	0.23
1B	None	36.6	255 ± 6.0	0.23
2B	Brewers' yeast	38.4	196 ± 6.0*	0.21
3B	Whey yeast	38.2	230 ± 8.2**	0.22
4B	Whey yeast + DL-Methionine	38.6	231 ± 9.7	0.21

^a One rat died on 25th day.

* P < 0.01; ** P < 0.05.

growth was significantly reduced, possibly due to an imbalance or inadequate amount of certain amino acids. It was anticipated that methionine would be the most limiting amino acid but, when methionine was added, no response in growth or food efficiency resulted (Diet 4B, Table 2).

All rats were autopsied at the end of the 90-day feeding period, examined grossly, and tissues saved for histopathological study. The only questionable abnormality noted by Dr. W. E. Ribelin, the veterinary pathologist who examined the slides, was the presence of yeast cells in the stomach and gland crypts of three out of five rats ingesting the whey yeast diet (3B). However, the presence of viable yeasts in the gastric glands of control rats was also observed.

There was no evidence of any toxic factor in whey yeast produced by growing *Saccharomyces fragilis* on milk whey. For optimum rat growth, both whey and brewers' yeast proteins require supplementation.

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REFERENCES

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